

Feb. 5, 1963

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3,076,559

CRANE WITH TILT-UP BOOM

Filed June 21, 1961

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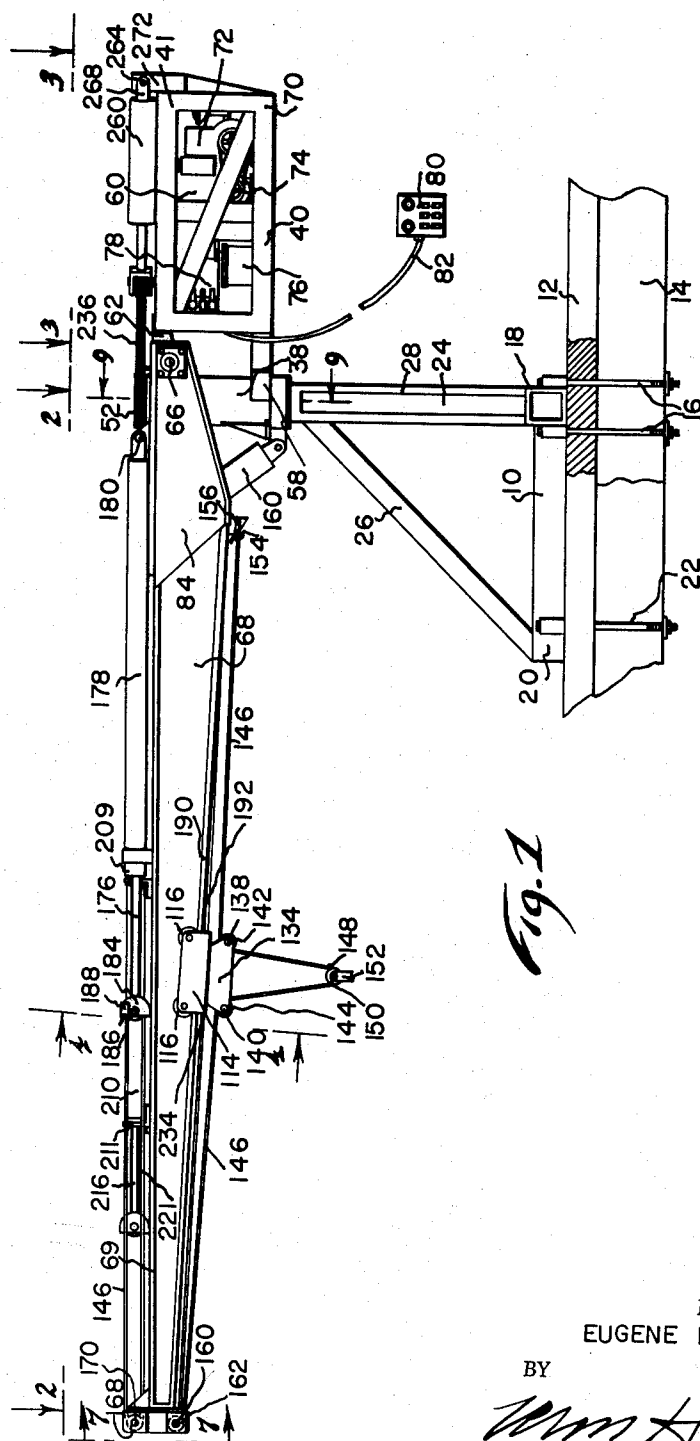


Fig. 1

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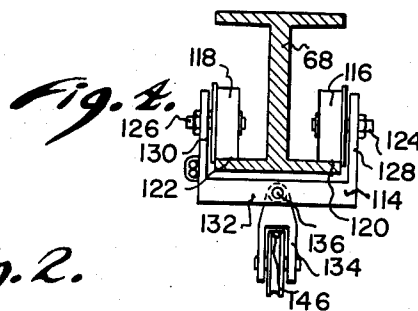
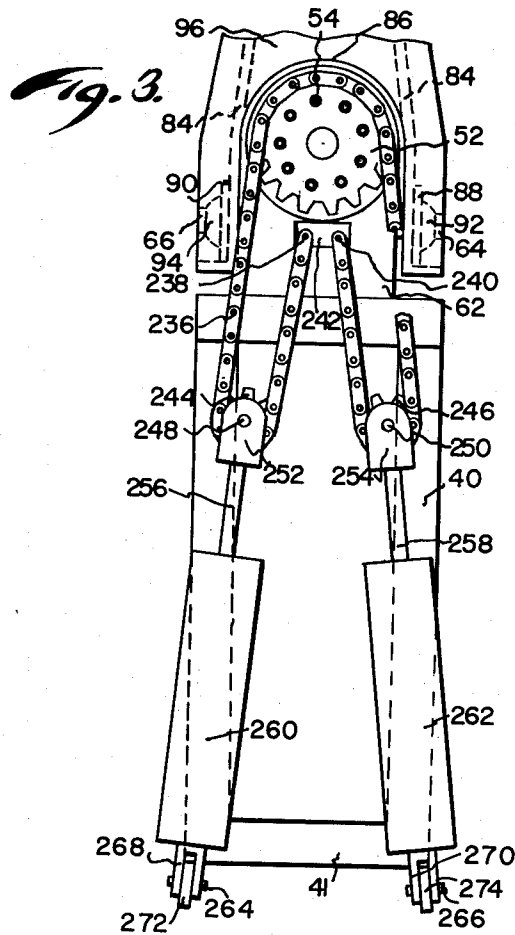
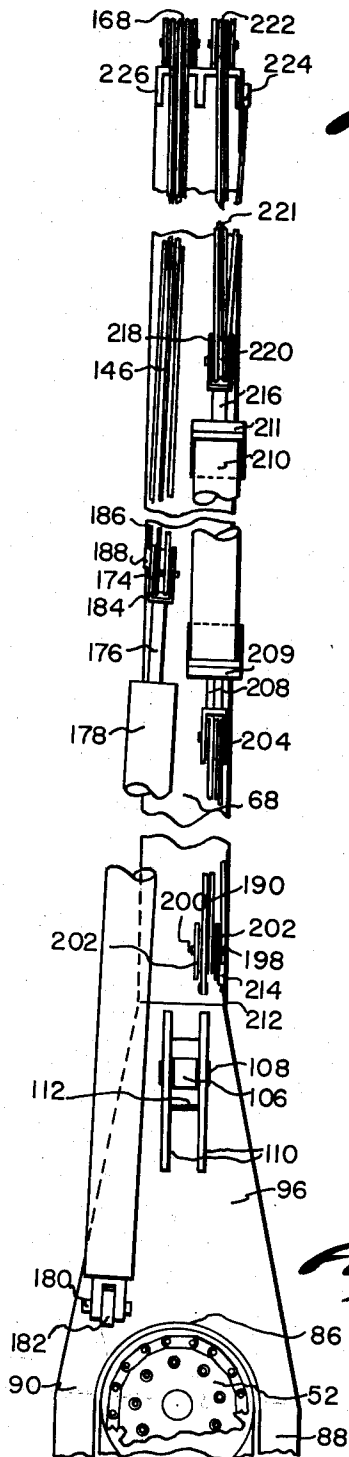
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CRANE WITH TILT-UP BOOM

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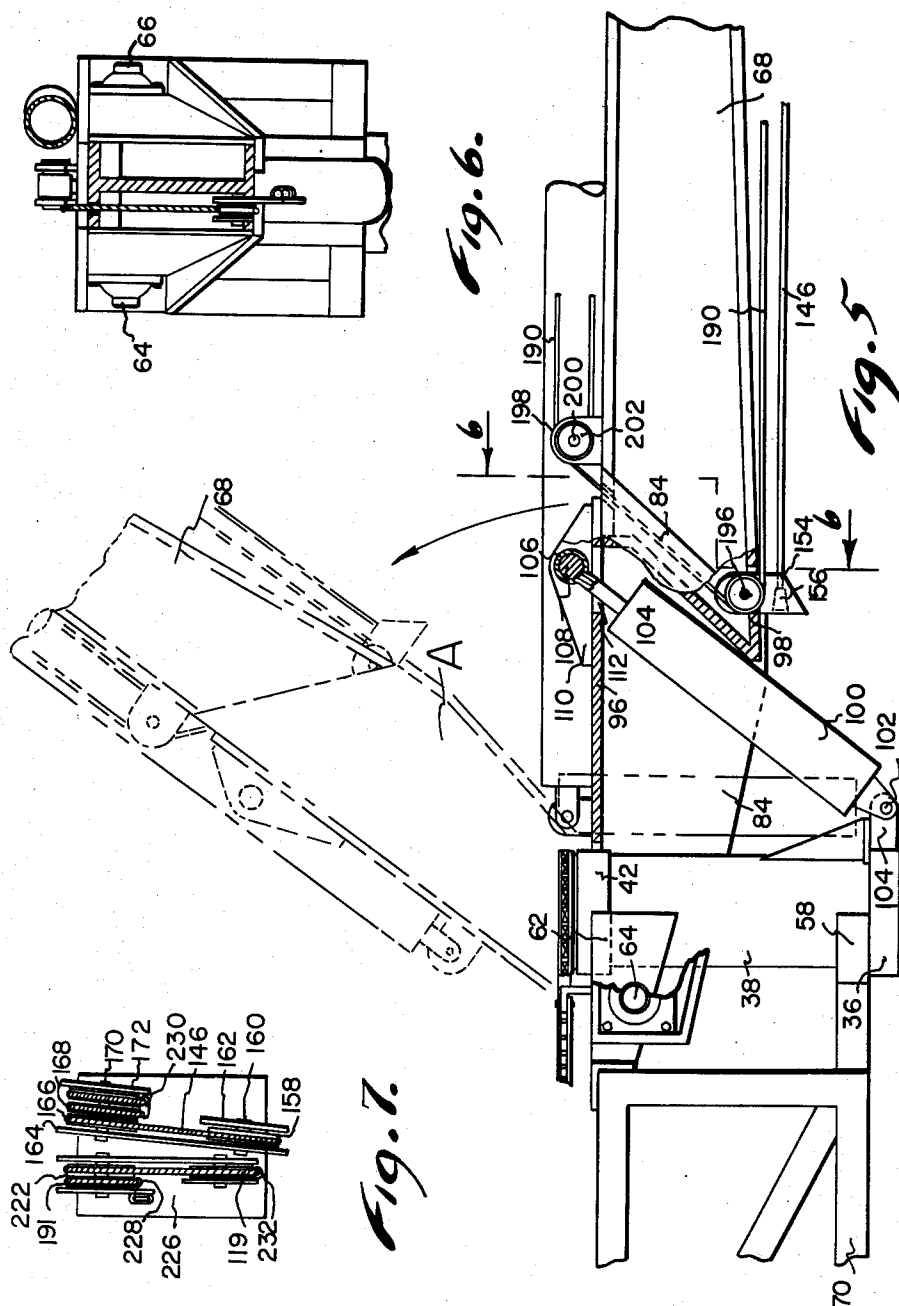
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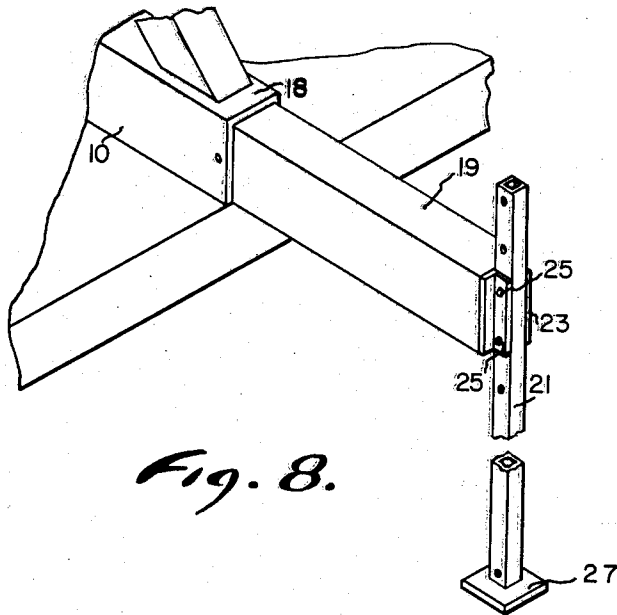


Fig. 8.

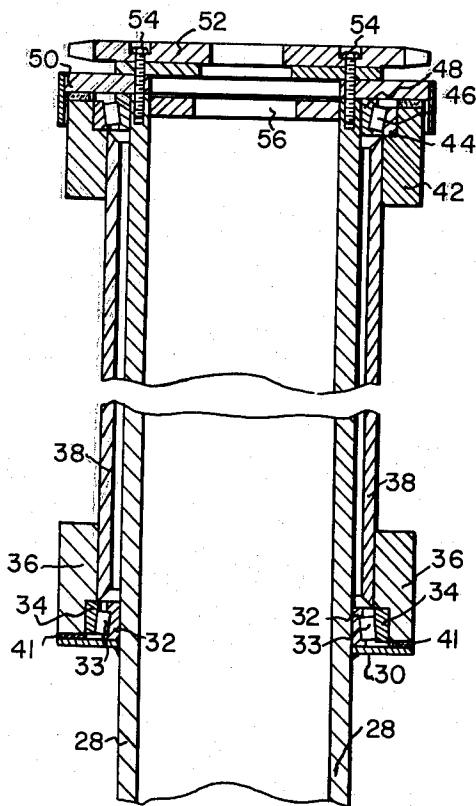


Fig. 9.

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3,076,559

CRANE WITH TILT-UP BOOM

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13 Claims. (Cl. 212-56)

This invention relates to a crane and more particularly to a crane for use on trucks for loading and unloading the same, said crane being adapted to handle cubes of concrete blocks or other material and having its entire motivating and power mechanism on a boom supporting frame; said boom supporting frame being pivotally mounted in elevated position on a column member and having a horizontal axis means pivotally supporting said boom, which is adapted to pivot upwardly about said horizontal axis means.

The invention, as disclosed herein, embodies an improvement over the crane disclosed in my co-pending application, Serial Number 852,424, filed November 12, 1959, for a crane.

Cranes, of conventional prior art construction, which are employed to load and unload flatbed trucks, generally include mechanism below the truck bed for actuating the crane and providing power for its operation. These cranes require a variety of mechanism which must be installed on the truck and operable in connection with the chassis thereof. Furthermore, such equipment is so located that it is difficult to service and maintain. Additionally, such equipment is ordinarily best suited to an installation on a relatively heavy truck.

The foregoing prior art structures are generally expensive from a standpoint of initial investment and further require installation facilities which are expensive.

Accordingly, it is an object of the present invention to provide a crane for loading and unloading trucks which may be installed on the upper surface of a truck bed without requiring any actuating means below the upper surface of the truck bed.

Another object of the invention is to provide a crane for loading and unloading truck beds, which is provided with a vertical column having a swingable boom supporting frame thereon; said boom supporting frame having substantially horizontal axis means pivotally supporting a boom which is adapted to be tilted upwardly into an inclined position relative to the horizontal; said frame carrying means for powering hoisting mechanism of the crane; boom swinging mechanism of the crane; and is also disposed to provide power for tilting the boom upwardly into an inclined position relative to the horizontal.

Another object of the invention is to provide a crane having a boom supporting frame swingable on a substantially vertical axis and carrying an engine which operates hydraulic power means which furnishes power for hoisting equipment on a boom pivotally mounted to said frame on a horizontal axis and, additionally, provides power to swing the boom around a vertical axis and to elevate it to an inclined position relative to the horizontal.

Another object of the invention is to provide a crane for loading and unloading flatbed trucks having a substantially vertical column on which a boom supporting frame is pivotally mounted in elevated position to swing about a substantially vertical axis, and whereon a boom is pivotally mounted on said frame; said frame extending from said column member in a direction opposite to that of the boom whereby power means mounted on the frame may tend to counterbalance some of the weight of said boom.

Another object of the invention is to provide a crane for loading and unloading flatbed trucks which is very

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simple and economical of construction, installation and maintenance.

Another object of the invention is to provide a crane for loading and unloading trucks having a novel power means totally supported in elevated position on a boom supporting frame near the upper end of a vertical column which is provided with a base for supporting the crane on a truck bed, whereby the boom, power means and boom supporting frame all swing above articles loaded above the crane face.

A further object of the invention is to provide a crane having a novel power mechanism mounted on a vertical column for swinging a crane boom about a vertical axis; for pivoting the boom about a substantially horizontal axis; for moving a carriage longitudinally of said boom and for actuating hoisting means relative to said carriage.

Further objects and advantages of the invention may be apparent from the following specification, appended claims, and accompanying drawings, in which:

FIG. 1 is a side elevational view of a crane constructed in accordance with the present invention;

FIG. 2 is an enlarged top or plan view taken from the line 2-2 of FIG. 1;

FIG. 3 is an enlarged fragmentary sectional view taken from the line 3-3 of FIG. 1;

FIG. 4 is an enlarged sectional view taken from the line 4-4 of FIG. 1;

FIG. 5 is an enlarged fragmentary side elevational view, similar to FIG. 1, but showing the structure disposed in the opposite direction and illustrating, by broken lines, an inclined elevated disposition of the crane and boom;

FIG. 6 is a fragmentary sectional view taken from the line 6-6 of FIG. 5;

FIG. 7 is an enlarged end view of the crane and boom taken from the line 7-7 of FIG. 1;

FIG. 8 is an enlarged fragmentary sectional view of the outrigger braces of the base structure of the crane, in accordance with the invention; and

FIG. 9 is an enlarged fragmentary sectional view taken from the line 9-9 of FIG. 1, omitting parts and portions of the crane and boom structure from the view.

As shown in FIG. 1 of the drawings, the crane of the invention is provided with a base 10, adapted to support the crane on an upper surface 12 of a truck bed 14. Bolts 16 secure horizontally disposed tubular members 18, of the base 10 onto the upper surface 12 of the truck bed 14.

The base is substantially T-shaped having a pair of oppositely disposed tubular members 18 and a horizontal member 20, normally disposed at right angles to the members 18, forming a generally T-shaped base structure. Bolts 22 secure the member 20 onto the truck bed 14 and angular braces 24 and 26 interconnect the outermost portions of the base members 18 and 20 with a substantially vertical column member 28. This vertical column member 28, at its lower end, is coupled to the base members 18 and 20 and is fixed thereto by welding or other suitable means, as desired.

As shown in FIG. 9 of the drawings, column 28 is provided with an annular shelf plate 30 on which the inner race of a roller bearing 32 is supported. This roller bearing is provided with an outer race 34 over which a sleeve shoulder ring 36 is engaged. Secured to this shoulder ring 36 is a tubular frame element 38 of a boom supporting frame 40, shown in FIG. 1, which will be hereinafter described in detail.

Positioned between the shoulder ring 36 and the shelf plate 30 is a dust seal 41, which may be made of felt or any other suitable material.

Secured to the normally upper end of the tubular member 38 is another shoulder ring 42 which is similar to

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the ring 36, and this shoulder ring 42 engages an outer race 44, of a bearing 46. The inner race 48, of the bearing 46, engages the outer side of the column member 28 near its upper end and a plate 50 is abutted to the upper end of the inner race 48 to maintain proper axial loading of the bearing 46. This plate 50, together with a sprocket 52, are secured to the column 28 by means of screws 54, which are screwthreaded into the upper end of the column 28.

Internally of the column 28, at its upper end, is a flat ring 56, serving as a compressive stiffener internally of the race 48, of the bearing 46. This flat ring 56 prevents a tendency, of the upper end of the tubular column member 28, to deflect under high loading, as will be hereinafter described.

Secured to the tubular frame member 38 are members 58, of the boom supporting frame 40, these members 58 form lower frame members which support the power means 60 of the crane, as will be hereinafter described. Upper frame members 62 are welded or otherwise secured to the tubular frame member 38 and projecting from opposite sides of these members 62 are boom supporting trunnions 64 and 66 which are disposed to provide for a pivotal mounting of the crane boom 68, on a substantially horizontal axis, as will be hereinafter described.

Carried by the frame members 58 and 62, in connection with the tubular frame member 38, is a generally box-shaped frame structure 70, in which a motor 72 is supported. This motor 72 drives a hydraulic pump 74, communicating with an accumulator 76 and a solenoid valve assembly 78, electrically coupled to a remote control panel 80 by means of a flexible conductor cord 82, as will be hereinafter described.

The boom 68 is generally I-beam in cross-section shaped and is provided at its rearward end with lap plates 84, on opposite sides thereof, which lap plates 84 form a bifurcated section 86, as shown in FIG. 3 of the drawings, whereby the rearward end of the boom is provided with forked members 88 and 90 carrying bearings 92 and 94, engaging the trunnions 64 and 66. The bifurcated portion 86, of the boom 68, partially surrounds the sprocket 52 and permits the boom 68 to tilt upwardly into a broken line position A, as shown in FIG. 5 of the drawings, while being supported on the trunnions 64 and 66, which are pivotally supported on a vertical axis, passing through the centers of the bearings 33 and 46, which pivotally support the tubular frame member 38, hereinbefore described.

The lap plates 84, at their upper edges, are interconnected by a heavy plate 96, whereby the lap plates 84 and the plate 96, together with the transverse plate 98, are welded to the rearward end of the I-beam structure of the boom 68 to provide a cantilever support therefor, and to permit central mounting of a hydraulic cylinder 100, which actuates the boom 68 about the axes of the trunnions 64 and 66, as indicated by broken lines in FIG. 5 of the drawings.

The hydraulic cylinder 100, at one end thereof, is pivotally mounted on a pin 102, which extends through a bracket 104, welded or otherwise secured to the ring 36, carried by the bearing 33 and tubular frame member 38. Thus, the lower end of the cylinder 100, as shown in FIG. 5 of the drawings, is pivotally mounted in connection with the boom supporting frame 40, which pivots about a substantially vertical axis, as hereinbefore described. The hydraulic cylinder 100 is provided with a reciprocal plunger 104 having a bearing 106 at its extended end. This bearing 106 is pivotally mounted on a pin 108, straddled by brackets 110, which are secured to the plate 96, hereinbefore described. The pin 108 extends through these brackets 110 and is in double shear with respect thereto, all as shown best in FIG. 2 of the drawings. It will be seen that the plate 96 is provided with an opening 112 through which the plunger 104 extends, and that this opening 112 is sufficiently long to per-

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mit the angular play of the plunger 104 therein as the boom 68 is pivoted from the solid line position, as shown in FIG. 5, to the broken line position shown therein.

The hydraulic cylinder 100 is coupled by conventional flexible conduits to one of the solenoid valves 78, which receives hydraulic pressure fluid from the accumulator 76, as energized by the pump 74, driven by the motor 72.

As shown in FIG. 4 of the drawings, a hoist carriage 114 is provided with rollers 116 and 118, which roll on upper surfaces 120 and 122, of the lower flanges of the I-beam structure of the boom 68. These rollers 116 and 118 are mounted on axle bolts 124 and 126, respectively, which secure them to upwardly extending arms 128 and 130, of the carriage 114. Interconnecting the arms 128 and 130 is a cross member 132, on which a sheave clevis 134 is pivotally mounted by means of a pin 136.

Pivotally mounted on a sheave clevis 134 are sheaves 138 and 140, these sheaves 138 and 140 are pivotally supported on the sheave clevis 134 by axle pins 142 and 144, respectively. The cable 146 extends over the sheaves 138 and 140 and an intermediate portion 148, of the cable 146, extends over a hoisting sheave 150, to which is pivotally connected a suitable bracket 152. This bracket 152 may support lifting forks or any other desirable hoisting mechanism, which may be adapted to handle cubes of concrete blocks or the like, whereby the crane of the present invention may load or unload cubes of concrete blocks or other materials relative to the upper surface 12 of the truck bed, shown in FIG. 1 of the drawings.

One end 154 of the cable 146 is secured to a stationary bracket 156 mounted on the boom 68 at its end near the hydraulic cylinder 100, as shown best in FIGS. 1 and 5 of the drawings. The cable 146 extends over a sheave 158 pivotally mounted on a pin 160 carried by brackets 162 and 164, at the outer end of the boom 68. The cable 146 passes upwardly from the sheave 158 over a sheave 166 of a multiple sheave 168, pivotally mounted on a shaft 170 carried between the brackets 164 and another bracket 172 on the outboard end of the boom 68.

The cable 146 extends, as shown in FIG. 2 of the drawings, over the multiple sheave 168 and over another multiple sheave 174, carried by a plunger 176, of a hydraulic cylinder 178, which is pivotally mounted by means of a pin 180, as shown best in FIG. 2 of the drawings. This pin 180 is disposed through a bracket 182 welded or otherwise secured to the upper surface of the plate 96, hereinbefore described.

It will be seen from FIG. 2 of the drawings, that the opposite end of the cable 146, from its end 154, is secured to a clevis 184, in which the multiple sheave 174 is mounted. Thus, this opposite end 186, of the cable 146, is held by a fixture 188 on the side of the clevis 184, carried by the plunger 176, of the hydraulic cylinder 178.

This hydraulic cylinder 178 may be energized in a direction to retract the plunger 176 by operating one of the switches on the remote control panel 80, which operates a respective member of the solenoid valve assembly 78, to conduct hydraulic pressure from the accumulator 76 through a conventional flexible conduit to the hydraulic cylinder 178, as will be hereinafter described in detail.

A cable 190, at its end 192, is secured to the carriage 114, in order to move it in one direction longitudinally of the boom 68.

The cable 190, from its end 192, extends over a sheave 196, as shown in FIG. 5 of the drawings, and extends over another multiple sheave 198, pivotally mounted on a pin 200, supported in brackets 202, on the top of the boom 68, all as shown best in FIG. 5 of the drawings. The cable 190 extends from the multiple sheave 198 over another multiple sheave 204, carried by a clevis 206, secured to a plunger 208, of a double ended hy-

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draulic cylinder 210, which is held at its opposite ends by brackets 209 and 211, fixed to the boom 68.

An opposite end 212, of the cable 190, from its end 192, connected to the upper surface of the boom 68, at 214.

The plunger 208, of the cylinder 210, is provided with an integral plunger portion 216, extending from the opposite end of the cylinder 210 and mounted on this plunger 216 is a clevis 218 carrying a multiple sheave 220, over which a cable 221 is engaged, this cable also passes over a multiple sheave 222 and has an end 224 fixed to a frame member 226, at the outer end of the boom 68.

As shown in FIG. 7, the frame 226 is provided with an opening 228 through which the cable 221 extends from the multiple sheave 222 and that this opening 228, as shown in FIG. 1 of the drawings, is above the upper surface 69, of the boom 68. Likewise, an opening 230 is provided in the frame 226 to provide a passage for the cable 146 over the multiple sheave 168.

An opening 232, near the lower portion of the frame 226, provides a passage for the cable 221, as it extends toward its end 234, which is fixed to the carriage 114.

It will be seen that the plungers 208 and 216 are extended from opposite ends of the hydraulic cylinder 210 and are coupled together so that they are reciprocal, relative to each other. As for example, when the plunger 216 is extended from the cylinder 210, the plunger 208 is retracted and when the plunger 208 is extended from the cylinder 210, the plunger 216 is retracted. Thus, the carriage 114 is moved reciprocally along the boom 68.

Due to the multiple sheaves 198, 204, 220, and 222, the short stroke of the plungers 208 and 216 may be amplified sufficiently, whereby the carriage 114 may be moved the full length of the boom 68. This condition is also true of the operation of cylinder 178 and its plunger 176, since the multiple sheaves 174 and 168, with relation to the cable 146, permits the extension or retraction of the middle portion 148 of the cable 146 in order to raise or lower the clevis 152 and sheave 150 a considerable distance.

As shown in FIGS. 2, 3, and 5, the sprocket 52 is engaged by a chain 236 and opposite ends 238 and 240, of this chain 236, are pinned to a block 242, carried by the bracket 62, of the boom supporting frame 40. Sprockets 244 and 246, pivotally mounted on clevis pins 248 and 250, engage intermediate portions of the chain 236. The pins 248 and 250 are carried by the clevises 252 and 254, respectively, which are carried by plungers 256 and 258, of hydraulic cylinders 260 and 262, respectively. The hydraulic cylinders 260 and 262 are mounted on pins 264 and 266 respectively, which extend through clevis portions 268 and 270 of the cylinders 260 and 262, respectively.

The pins 264 and 266 also extend through brackets 272 and 274, respectively, which are fixed to the rear member 41 of the boom supporting frame 40, all as shown best in FIGS. 1 and 3 of the drawings.

The hydraulic cylinders 260 and 262 are energized inversely of each other, so that, as for example, the cylinder 260 may be energized to retract its plunger 256 while the hydraulic cylinder 262 may be energized to permit its plunger 258 to be extended. In this manner, the sprocket 52 resists torque reaction of the chain 236 and causes the boom supporting frame 40 to rotate about the axes of the bearings 33 and 46, whereby the boom 68, together with the boom supporting frame, may pivotally be swung about the center of the column 28.

The hydraulic cylinders 260 and 262 are coupled by conventional flexible conduits to the solenoid valve assembly 78, which is controlled by the switches on the control panel 80.

As shown in FIGS. 1 and 8 of the drawings, the tubular members 18, of the crane base 10, are provided with

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telescopically extendable tubular members 19, having vertically disposed legs 21, removably secured between brackets 23 by pins 25. Feet 27 on the lower ends of the legs 21, provide an outboard support for the frame 10 to prevent tilting of the truck bed 12 when the crane picks up a load laterally thereof.

It will be seen that removal of the pins 25 will permit the legs 21 to be stowed in the hollow tubular member 19 and that it may be telescopically retracted into the respective tubular member 18, so that the outboard may readily and conveniently be compactly stowed with the base 10 of the crane when not in use or in transit.

In operation, it will be seen that the crane, according to the present invention, may be secured to the upper surface 12 of a truck bed and that no power equipment, in connection with the truck bed is required for operation of the crane, since the entire power source for the crane is contained in the boom supporting frame structure 40, as hereinbefore described.

Further, the boom, boom supporting frame and power means all swing above a load carried by the crane above the lower portion of the crane base.

The remote control 80 is provided with a variety of buttons for use in operating and controlling all of the principal elements of the crane. The motor 72 is provided with a conventional starter, and a starter button on the control panel 80, permits the operator to start the motor 72 which operates the hydraulic pump 74 and creates fluid pressure in the accumulator 76, which pressure fluid is controlled by a solenoid valve assembly, electrically connected with a plurality of switches disposed to control energization of the hydraulic cylinders 100, 178, 210, 260 and 262, as hereinbefore described.

It will be understood that equivalent power means may be provided and carried by the boom supporting frame 40, as desired. For example, electrical equipment may be utilized instead of hydraulic equipment but such equipment may be carried on the boom supporting frame 40, so that the entire crane assembly may be independent of any power mechanism carried by the truck bed 14.

When it is desired to start the engine 72, one of the buttons on the control panel 80 is pressed and when hydraulic pressure has been created in the accumulator 76, one of the buttons may be pressed to energize a solenoid valve in the assembly 78 to conduct pressure fluid to the cylinder 100, which then extends its plunger 104 and pivots the boom 68 upwardly about the axes of the trunnions 64 and 66, to a desired degree, whereby the carriage 114 may be elevated to a position higher than that normally attained when the boom 68 is disposed horizontally, as shown in FIG. 1 of the drawings.

When the boom is in horizontal position or elevated to any desired angle, it may be swung around the axis of the bearings 33 and 46 to any desired degree, by energizing the respective hydraulic cylinders 260 and 262, in accordance with a control on the panel 80 and operation of respective solenoid valve of the assembly 78.

When it is desired to actuate the carriage 114 longitudinally of the boom 68, a switch is operated on the control panel 80, in accordance with the direction that is desired to move the carriage 114. Thus, the hydraulic cylinder 210 is appropriately energized depending upon which direction the plungers 208 and 216 must move, as hereinbefore described. The abutments 209 and 211 hold the hydraulic cylinder 210 in fixed position longitudinally of the boom 68, while the respective cables 190 and 221 cause the carriage to traverse longitudinally of the boom 68. The clevis 152 supports load and the sheaves 138 and 140 merely support the loop 148 of the cable 146, while the carriage traverses the boom 68 to a desired position longitudinally thereof.

When it is desired to hoist the cable 152, the hydraulic cylinder 178 is energized by pressing an appropriate switch button on the control panel 80. This causes retraction of the plunger 176 and retraction of the cable 146, as

hereinbefore described, thereby shortening the intermediate section 148 of the cable 146 and raising the clevis 152.

It will be understood that a suitable hoist rack or hook assembly, secured to the clevis 152, is heavy enough so that it will, by gravitational force, extend the intermediate portion 148 of the cable 146, when the hydraulic cylinder 178 is de-energized. Thus, its plunger 178 is extended by tension on the intermediate portion 148, of the cable 146 and it will be understood that the sheaves 138 and 140 provide for lowering support of the cable 146 above its intermediate portion 148.

It will be apparent to those skilled in the art that the crane of the present invention embodies a novel combination of a vertical column having a boom supporting frame pivotally mounted on a substantially vertical axis and a tilting boom pivotally mounted on the boom supporting frame on a substantially horizontal axis. This overall combination permits the installation of the crane on a flatbed truck without supplying any power from the truck to the crane, since all of the power equipment is carried by the boom supporting frame 40, as hereinbefore described. Additionally, the tilt-up function of the boom 68 provides extreme versatility of the crane, since it may be used to load and unload the truck bed 12 with cubes of concrete blocks or other materials or the boom may be tilted upwardly so that such materials may be deposited in an elevated position above the truck bed level. Additionally, various articles may be unloaded from an elevated position above the truck bed level and deposited on the truck bed or the ground as desired.

It will be obvious to those skilled in the art that various modifications of the present invention may be resorted to in a manner limited only by a just interpretation of the following claims.

I claim:

1. In a crane, the combination of: an upstanding column member; a base therefor; an upper end of said column member disposed in elevated position above said base; substantially vertical axis bearing means supported on said column member near said upper end thereof; a boom supporting frame movably mounted on said bearing means and swingable about a substantially vertical axis thereof; a boom pivotally mounted on said boom supporting frame; pivot means having substantially horizontal axis mounting said boom on said frames at one side of said vertical axis; a motor on said frame; a hydraulic pump driven thereby; actuating means responsive to hydraulic pressure and supported by said frame on the opposite side of said vertical axis thereof from said pivot means, said actuating means disposed to force said boom to pivot upwardly about said substantially horizontal axis of said pivot means; and conduit means for conducting hydraulic pressure fluid intercommunicating with said pump and said actuating means.

2. In a crane, the combination of: an upstanding column member; a base therefor; an upper end of said column member disposed in elevated position above said base; substantially vertical axis bearing means supported on said column member near said upper end thereof; a boom supporting frame movably mounted on said bearing means and swingable about a substantially vertical axis thereof; a boom pivotally mounted on said boom supporting frame; pivot means having a substantially horizontal axis mounting said boom on said frame at one side of said vertical axis; a motor on said frame; a hydraulic pump driven thereby; actuating means responsive to hydraulic pressure and supported by said frame on the opposite side of said vertical axis thereof from said pivot means, said actuating means disposed to force said boom to pivot upwardly about said substantially horizontal axis of said pivot means; and conduit means for conducting hydraulic pressure fluid intercommunicating with said pump and said actuating means; said conduit means comprising a pressure fluid accumulator coupled to said pump;

and solenoid valve means interconnecting said accumulator and said conduit means.

3. In a crane, the combination of: an upstanding column member; a base therefor; an upper end of said column member disposed in elevated position above said base; substantially vertical axis bearing means supported on said column member near said upper end thereof; a boom supporting frame movably mounted on said bearing means and swingable about a substantially vertical axis thereof; a boom pivotally mounted on said boom supporting frame; pivot means having a substantially horizontal axis mounting said boom on said frame at one side of said vertical axis; a motor on said frame; a hydraulic pump driven thereby; actuating means responsive to hydraulic pressure and supported by said frame on the opposite side of said vertical axis thereof from said pivot means, said actuating means disposed to force said boom to pivot upwardly about said substantially horizontal axis of said pivot means; and conduit means for conducting hydraulic pressure fluid intercommunicating with said pump and said actuating means; said conduit means comprising a pressure fluid accumulator coupled to said pump; and solenoid valve means interconnecting said accumulator and said conduit means; and remote control switching means for actuating said solenoid valve means.

4. In a crane, the combination of: an upstanding column member; a base therefor; an upper end of said column member disposed in elevated position above said base; substantially vertical axis bearing means supported near said upper end of said column member; a boom supporting frame movably mounted on said bearing means and swingable about a substantially vertical axis thereof; a boom pivotally mounted on said boom supporting frame; pivot means having a substantially horizontal axis mounting said boom on said frame; a motor on said frame; a hydraulic pump driven thereby; first actuating means responsive to hydraulic pressure supported by said frame and disposed to force said boom to pivot upwardly about said substantially horizontal axis of said pivot means; and conduit means for conducting hydraulic pressure fluid intercommunicating with said pump and said first actuating means; carriage means movable longitudinally of said boom; second actuating means, responsive to hydraulic pressure fluid communicating with said pump, said second actuating means disposed on said boom to move said carriage longitudinally thereof.

5. In a crane, the combination of: an upstanding column member; a base therefor; an upper end of said column member disposed in elevated position above said base; substantially vertical axis bearing means supported near said upper end of said column member; a boom supporting frame movably mounted on said bearing means and swingable about a substantially vertical axis thereof; a boom pivotally mounted on said boom supporting frame; pivot means having a substantially horizontal axis mounting said boom on said frame; a motor on said frame; a hydraulic pump driven thereby; first actuating means responsive to hydraulic pressure supported by said frame and disposed to force said boom to pivot upwardly about said substantially horizontal axis of said pivot means; and conduit means for conducting hydraulic pressure fluid intercommunicating with said pump and said first actuating means; carriage means movable longitudinally of said boom; second actuating means, responsive to hydraulic pressure fluid communicating with said pump, said second actuating means disposed on said boom to move said carriage longitudinally thereof; hoist cable and sheave means on said boom and said carriage and vertically movably depending from said carriage; and third actuating means, responsive to hydraulic pressure fluid communicating with said pump, said third actuating means disposed on said boom to retract loaded cables of said cable and sheave means vertically below said carriage.

6. In a crane, the combination of: an upstanding column member; a base therefor; an upper end of said col-

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umn member disposed in elevated position above said base; substantially vertical axis bearing means supported near said upper end of said column member; a boom supporting frame movably mounted on said bearing means and swingable about a substantially vertical axis thereof; a boom pivotally mounted on said boom supporting frame; pivot means having a substantially horizontal axis pivotally mounting said boom on said frame; a motor on said frame; a hydraulic pump driven thereby; first actuating means responsive to hydraulic pressure supported by said frame and disposed to force said boom to pivot upwardly about said substantially horizontal axis of said pivot means; conduit means for conducting hydraulic pressure fluid intercommunicating with said pump and said first actuating means; and second actuating means coupled to said column and said frame, and responsive to hydraulic pressure fluid communicating with said pump, said second actuating means disposed to pivot said frame about a substantially vertical axis of said bearing means.

7. In a crane, the combination of: an upstanding column member; a base therefor; an upper end of said column member disposed in elevated position above said base; substantially vertical axis bearing means supported near said upper end of said column member; a boom supporting frame movably mounted on said bearing means and swingable about a substantially vertical axis thereof; a boom pivotally mounted on said boom supporting frame; pivot means having a substantially horizontal axis pivotally mounting said boom on said frame; a motor on said frame; a power delivery means driven thereby; actuating means responsive to power from said power delivery means supported by said frame and disposed to force said boom to pivot upwardly about said substantially horizontal axis of said pivot means; and power conducting means for conducting power intercommunicating with said power delivery means and said actuating means; a bifurcated portion of said boom having forks straddling said upper end of said column member; and rotary actuating means coupled to said upper end between said forks and disposed to rotate said frame about said vertical axis; ends of said forks being pivotally mounted on said pivot means.

8. In a crane, the combination of: an upstanding column member; a base therefor; an upper end of said column member disposed in elevated position above said base; substantially vertical axis bearing means supported near said upper end of said column member; a boom supporting frame movably mounted on said bearing means and swingable about a substantially vertical axis thereof; a boom pivotally mounted on said boom supporting frame; pivot means having a substantially horizontal axis pivotally mounting said boom on said frame; a motor on said frame; a power delivery means driven thereby; actuating means responsive to power from said power delivery means supported by said frame and disposed to force said boom to pivot upwardly about said substantially horizontal axis of said pivot means; and power conducting means for conducting power intercommunicating with said power delivery means and said actuating means; and remote control switching means for controlling said power conducting means.

9. In a crane, the combination of: an upstanding column member; a base therefor; an upper end of said column member disposed in elevated position above said base; substantially vertical axis bearing means supported near said upper end of said column member; a boom supporting frame movably mounted on said bearing means and swingable about a substantially vertical axis thereof; a boom pivotally mounted on said boom supporting frame; pivot means having a substantially horizontal axis pivotally mounting said boom on said frame; a motor on said frame; a power delivery means driven thereby; first actuating means responsive to power from said power delivery means supported by said frame and disposed to force said boom to pivot upwardly about said substan-

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tially horizontal axis of said pivot means; and power conducting means for conducting power intercommunicating with said power delivery means and said first actuating means; carriage means movable longitudinally of said boom; second actuating means, responsive to power from said power delivery means, said second actuating means disposed on said boom to move said carriage longitudinally thereof; said boom, boom frame, carriage and said motor, disposed to swing above articles carried by said frame above the lower portion of said base.

10. In a crane, the combination of: an upstanding column member; a base therefor; an upper end of said column member disposed in elevated position above said base; substantially vertical axis bearing means supported near said upper end of said column member; a boom supporting frame movably mounted on said bearing means and swingable about a substantially vertical axis thereof; a boom pivotally mounted on said boom supporting frame; pivot means having a substantially horizontal axis pivotally mounting said boom on said frame; a motor on said frame; a power delivery means driven thereby; first actuating means responsive to power from said power delivery means supported by said frame and disposed to force said boom to pivot upwardly about said substantially horizontal axis of said pivot means; and power conducting means for conducting power intercommunicating with said power delivery means and said first actuating means; carriage means movable longitudinally of said boom; second actuating means, responsive to power from said power delivery means, said second actuating means disposed on said boom to move said carriage longitudinally thereof; hoist cable and sheave means on said boom and said carriage and vertically movably depending from said carriage and third actuating means, responsive to power from said power delivery means, said third actuating means disposed on said boom to retract loaded cables of said cable and sheave means vertically below said carriage.

11. In a crane, the combination of: an upstanding column member; a base therefor; an upper end of said column member disposed in elevated position above said base; substantially vertical axis bearing means supported near said upper end of said column member; a boom supporting frame movably mounted on said bearing means and swingable about a substantially vertical axis thereof; a boom pivotally mounted on said boom supporting frame; pivot means having a substantially horizontal axis pivotally mounting said boom on said frame; a motor on said frame; a power delivery means driven thereby; first actuating means responsive to power from said power delivery means supported by said frame and disposed to force said boom to pivot upwardly about said substantially horizontal axis of said pivot means; and power conducting means for conducting power intercommunicating with said power delivery means and said first actuating means; and second actuating means coupled to said column and said frame; and responsive to power from said power delivery means, said second actuating means disposed to pivot said frame about a substantially vertical axis of said bearing means.

12. In a crane, the combination of: an upstanding column member; a base therefor; an upper end of said column member disposed in elevated position above said base; substantially vertical axis bearing means supported near said upper end of said column member; a boom supporting frame movably mounted on said bearing means and swingable about a substantially vertical axis thereof; a boom pivotally mounted on said boom supporting frame; pivot means having substantially horizontal axis mounting said boom on said frame; a motor on said frame; a hydraulic pump driven thereby; actuating means responsive to hydraulic pressure supported by said frame and disposed to force said boom to pivot upwardly about said substantially horizontal axis of said pivot means; and

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conduit means for conducting hydraulic pressure fluid intercommunicating with said pump and said third means; a bifurcated portion of said boom having forks straddling said upper end of said column member; and rotary actuating means coupled to said upper end between said forks and disposed to rotate said frame about said vertical axis; ends of said forks being mounted on said pivot means; said boom, boom frame and said motor, disposed to swing above articles carried by said crane above the lower portion of said base.

13. In a crane, the combination of: an upstanding column member; a base therefor; an upper end of said column member disposed in elevated position above said base; substantially vertical axis bearing means supported near said upper end of said column member; a boom supporting frame movably mounted on said bearing means and swingable about a substantially vertical axis thereof; a boom pivotally mounted on said boom supporting frame; pivot means having a substantially horizontal axis pivotally mounting said boom on said frame; a motor on said frame; a power delivery means driven thereby; actuating means responsive to power from said power delivery means supported by said frame and disposed to force said

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boom to pivot upwardly about said substantially horizontal axis of said pivot means; and power conducting means for conducting power intercommunicating with said power delivery means and said actuating means; a bifurcated portion of said boom having forks straddling said upper end of said column member; and rotary actuating means coupled to said upper end between said forks and disposed to rotate said frame about said vertical axis; ends of said forks being mounted on said pivot means; said boom, boom frame and said motor, disposed to swing above articles carried by said crane above the lower portion of said base.

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